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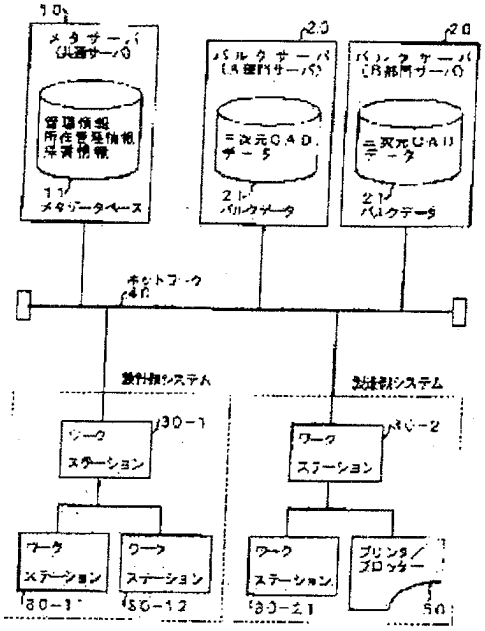
(22)Date of filing : 26.06.1997 (72)Inventor : YASUE MITSURU

(54) DESIGN INFORMATION MANAGEMENT SYSTEM, DESIGN INFORMATION ACCESS DEVICE AND PROGRAM STORING MEDIUM

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a design information management system capable of unitarily managing design information bulk data, transmitting device/parts data at real time and smoothly executing data cooperation between a design side system and a production side system.
SOLUTION: A common meta-server 10 unitarily manages model data management information. On the other hand, plural bulk servers 20 respectively store individual model data designed in each section. A work station 30 for accessing design information acquires management information for model data to be used from the meta-server 10 and accesses the bulk sever 20 storing the model data concerned based on the management information. At the time of preparing/ updating the model data, the management information is registered in the meta- server 10 and the model data are stored in the bulk server 20. The meta-server 10, the bulk server 20 and the work station 30 mutually execute communication through a WAN or LAN network 40.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invenlion relates to the program storage which realizes the design-information managerial system for performing design-information management as the data transfer approach to the manufacture from the design in a manufacture, design-information access uipment, and it.
[0002]
[Description of the Prior Art] When manufacturing the equipment which generally consists of various component parts, it is performed that an architect or a design group hands a manufacture side group the drawing of the three dimensional object model data which used and designed 3-dimensional CAD software etc. and were designed in each components of those, and a manufacture side group manufactures components and equipment with reference to the design information containing a drawing.
[0003] In such a design/a manufacturing system, the technique mainly used is as follows conventionally.
(a) Three dimensional object model data were managed by the data control approach which became independent in the workstation in which the three-dimensions modeling system is carried, and have closed the management in each workstation.
[0004] (b) Create the drawing as manufacture data from three dimensional object model data separately, collect the manufacturer's drawing for distribution using the system of another administrative host computer, and distribute with the drawing of the paper printed out at the manufacture base.
[0005] (c) As for the common components data used in common with two or more equipment or components, common parts control offer origin offers data to a design side.
[0006]
[Problem(s) to be Solved by the Invention] (a) mentioned above There is the following problem in a method. Each workstation is dotted with the same components information, and unific data control is not made to the 1st.
[0007] When designing the existing components and similar components to the 2nd and there are no model data of the existing component in an activity workstation, an appropriation design cannot be carried out using model data.
[0008] Since the control of a model to a design change is left [3rd] separately, the control to the whole equipment constituted with many components is difficult. Since unitary management of the same equipment and the model data of components is not carried out, modification processing of model data etc. is separately carried out by the 4th.
[0009] (b) mentioned above If it attaches, there is the following problem. Since a paper drawing is distributed to the 1st as manufacture data, it is necessary to carry out data transfer of the activity to the raw data to the workstation of one's need post by another processing.
[0010] Since the calculating machine for manufacturer's drawing management differs from the calculating machine for three dimensional object model data storage in the 2nd, link relation between drawing-control information and three dimensional object model data cannot be taken. (c) mentioned above If it attaches, there is the following problem.

[0011] Management of the equipment used of common components and components is not made to the 1st. In order that the change notice to common components may be late for the 2nd in time, a time gap arises and trouble is caused to components arrangement etc.
[0012] It aims at enabling it to perform smoothly data cooperation between a design side system and a manufacture side system, this invention aiming at solution of the above-mentioned trouble, enabling unitary management of design-information bulk data, and using signal transduction [real time / data / equipment / / components] as possible.
[0013]
[Means for Solving the Problem] In the design-information managerial system with which this invention contains the three dimensional object model data which are in cooperation to the design-information metadata and metadata for design-information management An equipment configuration, a bill of materials, etc. Aim at object cooperation with the configuration management information to manage, and the equipment configuration and each components data which were created by the three-dimensions modeling system, and metadata, such as configuration information of design information and location information, is accumulated in the database of a common meta-server. The three dimensional object model data which the design side created It accumulates in the database of the bulk server for every category. A design or the design-information access equipment of a manufacturing department When using design information, it is characterized by pulling out data from the database of a bulk server which has three dimensional object model data which acquire and need the location information on each component part through a network from a meta-server.
[0014] Moreover, it is characterized by giving the user authority information which shows the modification propriety of a components object, and design-information access equipment having a means to check the modification propriety of design information with reference to user authority information at the time of renewal of design information, in the attribute information registered into a meta-server.
[0015] Moreover, it is characterized by for the component to give the information which shows whether they are the common components used for two or more equipment or components, and to have a means notify the user or the manager of components who uses the common component when the design information update confirms whether be a thing about common components at the time of renewal of design information and design-information access equipment is common components of modification of common components, in the configuration information of the components which register into a meta-server, or attribute information.
[0016] Moreover, in design-information access equipment, when exporting model data from a bulk server, it is characterized by having the means which takes out collectively the three dimensional object model data with which the components group in a parentage is related from the configuration information about the equipment and the components which a meta-server manages.
[0017] The program performed in the design-information access equipment for realizing the above system is storable in the suitable storage which a computer can read. A means to register the configuration information concerning [the program] equipment and components and attribute information including the information on the model data storage location of the object about the equipment and components to a meta-server, A means to import the model data generated or updated to the corresponding bulk server based on the information on the storing location in the attribute information on the object which a meta-server manages, Based on the information on the storing location in the attribute information on the object which a meta-server manages, the program for operating the computer of design-information access equipment is included as a means to export model data from the corresponding bulk server.
[0018]
[Embodiment of the Invention] Drawing 1 is the outline explanatory view of this invention. The meta-server to which ten carry out unitary management of the management information of model data, the metadata base in which 11 has the management information of the model data based on a relational database etc., the bulk server which holds each model data with which 20 was designed, respectively, and 21 express among drawing the bulk data which consist of model data (3-dimensional CAD data etc.) of-dimensional [2] or three dimensions.
[0019] Moreover, it is the workstation which 30 acquires the management information of model data

from the meta-server 10, accesses the bulk server 20 which holds applicable model data based on this management information, and processes model data, and 30-1, 30-11, and 30-12 express the workstation of the manufacture side system by which especially the workstation of a design side system, 30-2, and 30-21 are arranged at a plant etc. A printer/plotter for 40 to output networks, such as WAN or LAN, and for 50 output a manufacturer's drawing are expressed.

[0020] The bulk servers 20 arranged for every category, such as each workstation 30 which accesses design information, the common meta-server 10 and A category, and B category, are connected to the networks 40, such as WAN or LAN. The location information and configuration information of design information (a single step / multistage floor area article configuration, object drawing number, etc.) are accumulated in the metadata base 11 which the common meta-server 10 has. The three dimensional object model data which the design side system created are stored in the database of the bulk server 20 of each section.

[0021] When using design information by workstation 30 in a self-system, a design and a manufacturing department can access to the bulk server 20 which corresponds by the location management information pulled out from the metadata base 11 of the meta-server 10, and can read the bulk data 21.

[0022] Control of modification propriety is attained by giving the user authority information on modification propriety to the management information of the common components which the meta-server 10 manages. Moreover, when a design category changes common components, the common components change notice for demanding caution from other design categories or manufacturing departments of components which use it with e-mail etc. is performed.

[0023] The meta-server 10 carries out unitary management of all the design-information metadata, and about the bulk data 21, in order to manage dispersedly to the bulk server 20 of each section, signal transduction [real time / data / equipment / / components] becomes possible between two or more design categories and a manufacturing department. Especially, according to this configuration, compared with the case where centralize all metadata and all bulk data on one host processor, and it manages, a load distribution becomes possible, and since it is possible to arrange each bulk data near the location which uses it most, the cutback of communication link cost is also attained.

[0024] Drawing 2 shows the example of a configuration of this invention. The same thing as drawing 1 is expressed with the same sign among drawing. The components configuration information 12 in the metadata base 11 is information which shows whether equipment and components consist of components like other throats. For example, it is managed by the data of the tree structure (tree structure), and Equipment A consists of components a1, a2, and a3, and components a1 consist of other components a11 and a12, and it has the information that components a2 consist of other components a21 and a22.

[0025] The common components information master table 13 is a table which memorizes the information about the common components used for two or more equipment or components. The user authority master table 14 is a table which memorizes the access permission information on a user's design information. The model data storage point master table 15 is a table which memorizes the storing place information on model data (bulk data 21).

[0026] Here, although such information is managed on the table of a relational database, it is not necessarily restricted to a relational database. however, when constituted from a relational database, a general-purpose Relational Database Management System is stationed permanently at the meta-server 10 -- sufficient -- since access to required data can be simply performed using the accessing function of a relational database from each workstation 30, it is suitable.

[0027] Each workstation 30 which accesses design information The designed components configuration information The object information / an attribute information definition processing means 32 to define a components configuration information definition processing means 31 to give a definition, the designed object information, and its attribute information, a model data import processing means 33 to import the designed model data into the bulk server 20, and the model data to be used When the management information or model data of a model data export processing means 34 to export from the bulk server 20, an object modification propriety check processing means 35 to check the modification propriety of design information, and common components is changed It has a common components change-notice processing means 36 to notify the purport

changed into the user of the common component.

[0028] Drawing in which drawing 3 shows the example of metadata and bulk data, and drawing 4 are the related explanatory views of metadata and bulk data. Bulk data are model data created by the three-dimensional-CAD system as shown in drawing 3 (A) etc. Assembly a is constituted from components a1 and components a2 by this example. Metadata is management information including the attribute information about these objects, for example, is information as shown in drawing 3 (B). Information, such as a possession group name which is the manager of location locations, such as creation tool names, such as CAD software which created the part number for every each part article, a components name, and its model data, location host information on model data, a directory name in a location host, and a file name, and the model data of those, is included in metadata.

[0029] The relation of these metadata and bulk data is shown in drawing 4 . Here, objects, such as model data dealt with, are called the object. It is managed by the layered structure and each part article is the part number of each component. - They are a, a1, a2, and the object number given to model data. - x1, x2, and x3 are linked and it is attribute information to each object. - y1, y2, and y3 are defined. Attribute information is information, such as a creation tool name which was mentioned above, a location location of model data, and a possession group name. The bulk data 21 of each object are pointed at from the location information on attribute information. Metadata is accumulated in the meta-server 10 and each bulk data 21 is stored in the bulk server 20 according to category.

[0030] Equipment and components configuration information are controlled by the part number as shown in drawing 4 , the object number, and link relation of the attribute information and raw data (model data) as mentioned above.

[0031] The components configuration information definition processing means 31 shown in drawing 2 has the function to define the parentage of a component part, and the assembly of part number-a is the part number as an equipment configuration or a bill of materials. - They are a1 and the part number. - It defines consisting of components of a2 as metadata, and registers with the meta-server 10. Thereby, each workstation 30 can grasp the equipment and the whole component, or the partial configuration information for a design / manufacture.

[0032] Moreover, object information / attribute information definition processing means 32 defines as metadata the number (object number) which gave the data reduction information for manufacturing the component to each components. Thereby, cooperation relation between the part number and an object number is made. Furthermore, object information / attribute information definition processing means 32 gives creation tool information, authority information, managing agency information (possession group name information), and bulk location information as the attribute information to each object number.

[0033] The model data import processing means 33 imports bulk data (model data) to the bulk server 20 defined as bulk location information. By these, the cooperation relation of the part number as shown in drawing 4 , an object number, and bulk data can be held now.

[0034] Drawing 5 is the processing flow chart of a components configuration information definition processing means. The components configuration information definition processing means 31 defines the parentage of a component part by processing shown in drawing 5 (A).

[0035] An equipment configuration parent lot number is specified at step S1. For example, in bill-of-materials relation as shown in drawing 5 (B), the lot number of Equipment A is specified first. Next, at steps S2 and S3, the processing which specifies the component item for constituting a parent item hierarchical one by one is repeated. It is [- They are a2 and a unit. / - About b, they are components. / - They are b1 and components. / - b2 will be defined.] a unit to the degree of Equipment A. - a and unit-b are defined and it is a unit further. - About a, they are components. - They are a1 and components.

[0036] Then, in step S4, it requests storing in the metadata base 11 the definition information on a configuration tree as shown in drawing 5 (B) which the repeat of steps S2 and S3 defined to the meta-server 10.

[0037] Drawing 6 is the processing flow chart of object information / attribute information definition processing means. By processing shown in drawing 6 (A), object information / attribute information definition processing means 32 defines attribute information, such as the data storage point (the machine name / location location) and user authority information on the object, and a creation tool

name, to the defined object number while defining an object number.
[0038] For this reason, the part number which links an object first is specified at step S10. Next, at step S11, the object number uniquely given by the system is specified. Next, at step S12, object data attributes, such as assignment of a representation object creation tool, assignment of a design day and an architect, and assignment of an object name, are set up.
[0039] At step S13, acquisition of a bulk server host name, acquisition of a bulk server storing location, and acquisition of user access group information are performed from the model data storage point master table 15 in the metadata base 11 which the meta-server 10 has, or user authority master table 14 grade, and collating with the data newly defined as these data is performed. Then, at step S14, storing at the metadata bases 11, such as an object number, its data attribute, and location management information, is requested from the meta-server 10.
[0040] They are components as the above processing shows to drawing 6 (B). - It is an object number to a1. - aa1 will be linked and information, such as a created CAD software name, a design day, and object location information (WS1:/usr/tmp), will be set up as an object data attribute.
[0041] Drawing 7 is the processing flow chart of a model data import processing means. The model data import processing means 33 imports three dimensional object model data to the bulk data 20 by processing shown in drawing 7 (A) based on the information which object information / attribute information definition processing means 32 defined. By this, as shown in drawing 7 (B), a single ring of bulk data, such as a model data file in the configuration information, an object number and attribute information, and the bulk server 20 of each part article, can be injured with relation, and it goes up.
[0042] For this reason, at step S20, the storing location of the model data to import is specified first. Next, at step S21, the file name in which import model data are stored in the workstation 30 is specified. Next, at step S22, the model data of an assignment storing location are moved to the bulk server 20, and are recording is requested to the bulk server 20.
[0043] Drawing 8 is a model data export explanatory view. The model data export processing means 34 is a means to perform processing which incorporates the bulk data (raw data) which are hanging down from the assignment object number to its own workstation 30. Especially, in the case of three dimensional object model data, combination is not made only by one model data. In the case of a three dimensional object model, a series of bulk data of an assembly model (assembly model) to a components model (PERT model) must be. Therefore, the configuration number (part number) to an assignment object number is made into the top information on a component part, the hypostatic region article is searched, and the attribute of the object number which is in cooperation in the hypostatic region article detects what is three dimensional object model data, and takes out those data constellations collectively.
[0044] A workstation 30 acquires object location information from the meta-server 10 by the specification part lot number number or the object number first for export of this model data ((a) of drawing 8). Next, a workstation 30 goes to see the bulk server 20 in which bulk data exist based on the acquired information ((b) of drawing 8). And the bulk data which exist in the bulk server 20 are copied to the export place field in the self-workstation 30 ((c) of drawing 8).
[0045] Drawing 9 is the processing flow chart of a model data export processing means. The flow of fundamental processing of the model data export processing means 34 is as being shown in drawing 9 (A), specifies the part number to export at step S30 first, and specifies an object number at step S31. Next, an export place is specified at step S32. At step S33, the location location of the bulk data obtained from the meta-server 10 copies bulk data to an export place from a bulk server.
[0046] Export of three dimensional object model data comes to be shown in drawing 9 (B) for package collection of the data constellation of two or more components. At step S40, the part number / object number to export are specified. An export place is specified at step S41. When an object number is specified (S42), the part number is searched for from an object number by step S43. Next, at step S44, the configuration tree information which makes a specification part lot number number the top is searched for from the meta-server 10.
[0047] At step S45, the attribute information on the object to the object number which is hanging down from the configuration tree for which it asked is searched for. At step S46, if it judges whether it is that to which the creation tool of the object creates three dimensional object model data from

attribute information and three dimensional object model data are not created, it will return to step S45 and processing to the following object number will be performed.

[0048] If the creation tool of an object creates three dimensional object model data, step S47 will copy bulk data to an export place from a bulk server based on the location location of the bulk data obtained from the meta-server 10. At step S48, if it judges whether ejection was completed or not and has not ended about the components of all configuration trees, it returns to step S45 and processing is repeated similarly.

[0049] Drawing 10 is the processing flow chart of an object modification propriety check processing means. It announces to a user that it cannot be edited if the object specified by the edit system checks the object modification propriety check processing means 35 by collating attribute information and the user authority master table 14 for whether it is what modification was permitted to the user and there is no authority.

[0050] For this reason, at step S50, the object number of the object which it is going to change is specified first. At step S51, the user authority master table 14 which the meta-server 10 manages is referred to. And at step S52, collating with the attribute of an assignment object and the data of the user authority master table 14 is performed. If modification of the object of a user authority master table 14 odor lever is permitted to the object utilization modification person by the judgment of step S53, it will progress to step S54 and object edit processing will be performed. If modification is not permitted, step S55 notifies an object modification failure, and processing is ended.

[0051] Drawing 11 is the processing flow chart of a common components change-notice processing means. When the attribute information on an object object is a three dimensional object model, and is common components and a common parts control person changes the information on the component, the common components change-notice processing means 36 searches the object number which is using the component, and is a means which takes out a change notice to the user of the object currently used.

[0052] The object number to change is specified at step S60. At step S61, common components master information is acquired from the common components information master table 13 of the meta-server 10. At step S62, an assignment object number judges whether it is a thing about common components, and if it is not common components, processing will be ended.

[0053] If it is common components, the modification person of common components will judge further whether it is a managing agency by step S63, if it is not a managing agency, the last update information of common components will be expressed as step S64, and processing will be ended.

[0054] If it is a managing agency, it will progress to step S65, edit processing of an object will be performed, and the update information in the common components information master table 13 will be updated at step S66. Then, the purpose-for-spending point of this common component is searched step S67, and the components attribute of the purpose-for-spending point is searched for at step S68. At step S69, it asks for the mail address of a purpose-for-spending point components attribute, and e-mail performs the change notice of common components in step S70. Thereby, the management accompanying modification of common components in an e-mail addressee is attained.

[0055] Drawing 12 shows the example of a configuration of the master table in the metadata base. The common components information master table 13 has information, such as a number of the number of the common part number and versions, an architect, a design day, and a management group, and a last update date, for every common components, as shown in drawing 12 (A).

[0056] The user authority master table 14 has information, such as a role of a user, such as a number of a login ID, the password specified at the time of a log in, and the access group (category) which belongs, a mail address, for example, an architect, and an acknowledgement person, and a role number, for every user, as shown in drawing 12 (B). Although a role means access permission information, it may manage an access permission for the information on other formats.

[0057] The model data storage point master table 15 has the information on ip address of the machine name of an access group and an access host as shown in drawing 12 (C), access volumes (directory etc.), and an access host etc.

[0058] The attribute information shown in drawing 4 holds the information which shows the record (entry) of each of these tables. In addition, the table format shown in drawing 12 is an example, and, of course, can also have the information on the versatility in the form of versatility in others.

[0059]
[Effect of the Invention] As explained above, according to this invention, there is the following effectiveness.
(1) Since a series of relation of even a component part number to an object number and object data can be held, data cooperation becomes smooth.
[0060] (2) Management of equipment or an entire component is possible by the configuration information to equipment or components.
(3) The ejection of equipment / bill of materials, and object information to a three-dimensions data constellation is possible.
[0061] (4) The change management of common components becomes smooth and the advice to its post related [one's] can carry out to real time.
(5) Since unitary management of metadata information and the bulk data information is carried out, it becomes unnecessary to manage separately.

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CLAIMS

[Claim(s)]
[Claim 1] The meta-server which carries out unitary management of the management information of model data, and two or more bulk servers which hold each designed model data, respectively, Two or more design-information access equipments which acquire the management information of the model data used from said meta-server, access the bulk server which holds applicable model data based on this management information, and process model data, The design-information managerial system characterized by consisting of networks which connect said meta-server, said bulk server, and said design-information access equipment.
[Claim 2] The management information of said model data is a design-information managerial system according to claim 1 characterized by including the information which cooperates the configuration information about equipment and components, and each model data created by the three-dimensions modeling system.
[Claim 3] A network is bulk minded [the meta-server which carries out unitary management of the management information of model data, and / which hold each designed model data, respectively / two or more]. The configuration information are design-information access equipment connected and concerning equipment and components, A means to register attribute information including the information on the model data storage location of the object about the equipment and components to said meta-server, A means to import the model data generated or updated to said corresponding bulk server based on the information on the storing location in the attribute information on the object which said meta-server manages, Design-information access equipment characterized by having a means to export model data from said corresponding bulk server, based on the information on the storing location in the attribute information on the object which said meta-server manages.
[Claim 4] Design-information access equipment characterized by having a means for there to be user authority information which shows the modification propriety of the object at least, and to check object modification propriety with reference to said user authority information at the time of renewal of said model data or the attribute information on an object, into the attribute information registered into said meta-server in design-information access equipment according to claim 3.
[Claim 5] In design-information access equipment according to claim 3, the information which shows whether they are the common components with which the component is used for two or more equipment or components at least is in the configuration information of the components registered into said meta-server, or attribute information. Said model data Or a means to notify the manager or user of the equipment which confirms whether the object is common components, and uses the common component at the time of renewal of the attribute information on an object in being common components, or components of modification of common components Design-information access equipment characterized by having.
[Claim 6] A means to export model data from said bulk server in design-information access equipment according to claim 3 is design-information access equipment characterized by being the means which takes out collectively the three dimensional object model data with which the components group in a parentage is related from the configuration information about the equipment and the components which said meta-server manages.
[Claim 7] In the design-information access equipment connected to the meta-server which carries out unitary management of the management information of model data, and two or more bulk servers

which hold each designed model data, respectively through a network The configuration information which stored the program performed are a storage and concerning equipment and components, A means to register attribute information including the information on the model data storage location of the object about the equipment and components to said meta-server, A means to import the model data generated or updated to said corresponding bulk server based on the information on the storing location in the attribute information on the object which said meta-server manages, The program storage characterized by storing the program which realizes a means to export model data from said corresponding bulk server based on the information on the storing location in the attribute information on the object which said meta-server manages.

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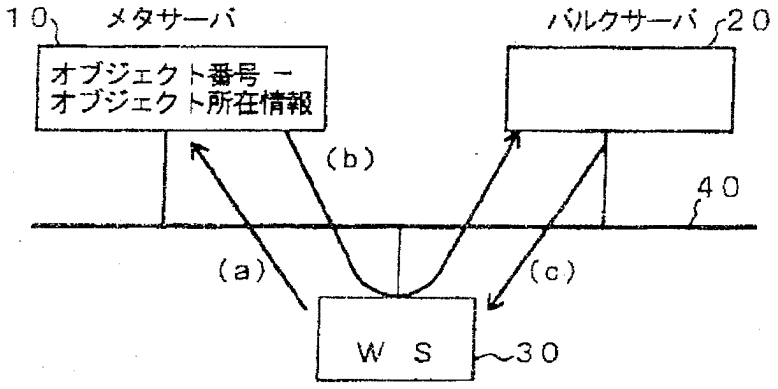
DRAWINGS

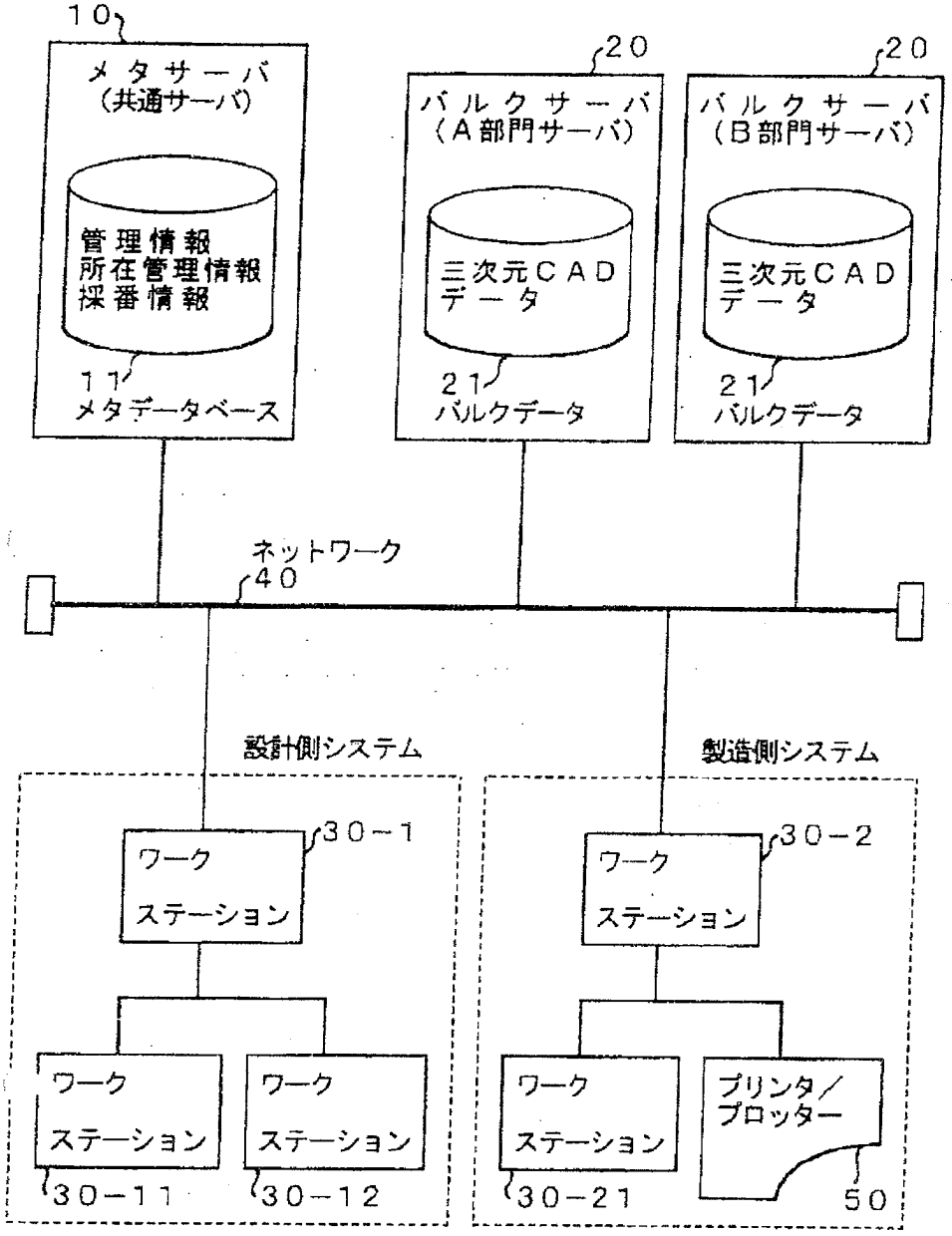
[Drawing 8]

モデルデータ移出説明図

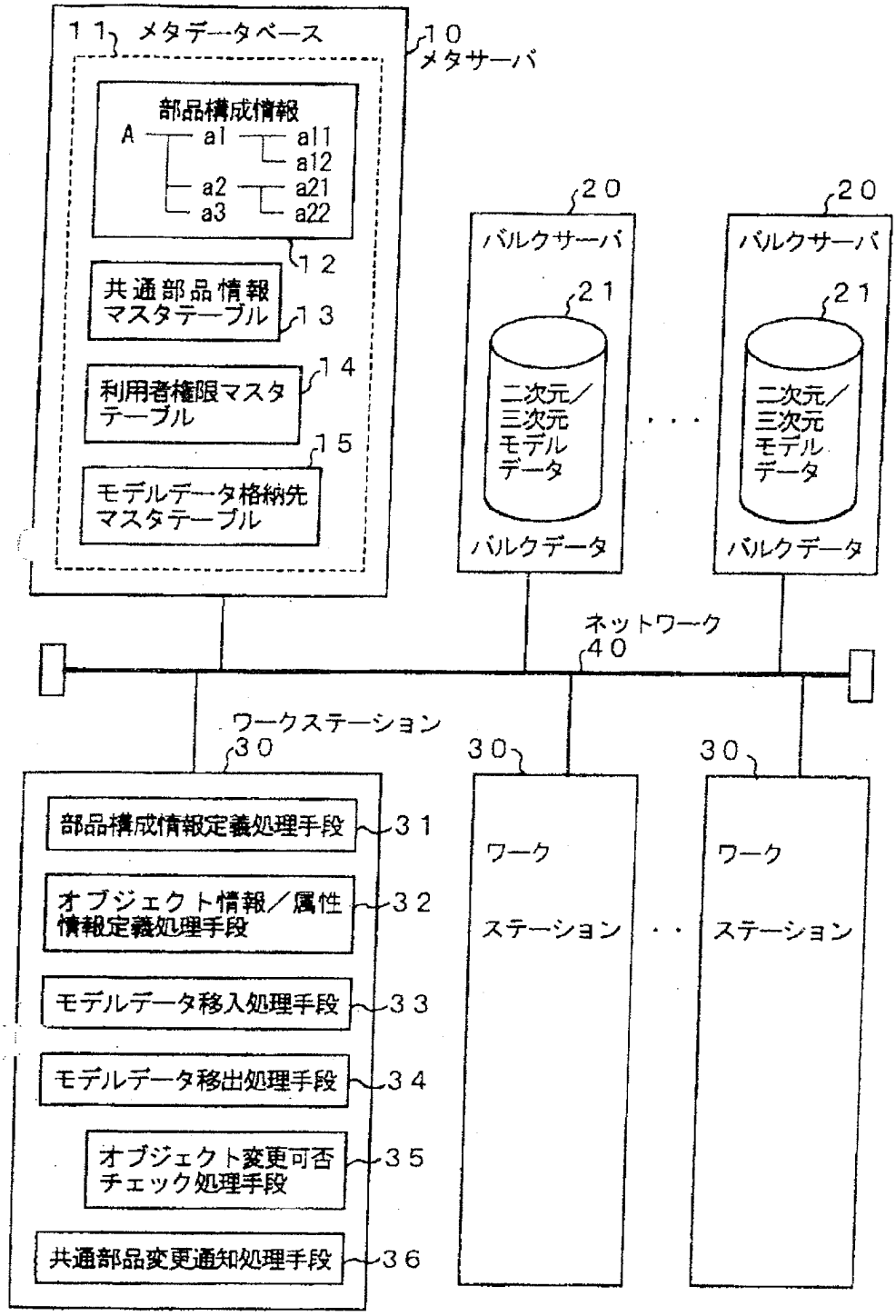


[Drawing 1]

本発明の概要説明図



[Drawing 2]


11 メタデータベース
10
メタサーバ
部品構成情報
A
a1
a2
a3
a11
a12
a21
a22
12
共通部品情報
マスタテーブル
13
利用者権限マスタ
テーブル
14
モデルデータ格納先
マスタテーブル
15
20
バルクサーバ
21
二次元／
三次元
モデル
データ
バルクデータ
20
バルクサーバ
21
二次元／
三次元
モデル
データ
バルクデータ
ネットワーク
40
ワークステーション
30
部品構成情報定義処理手段
31
オブジェクト情報／属性
情報定義処理手段
32
モデルデータ移入処理手段
33
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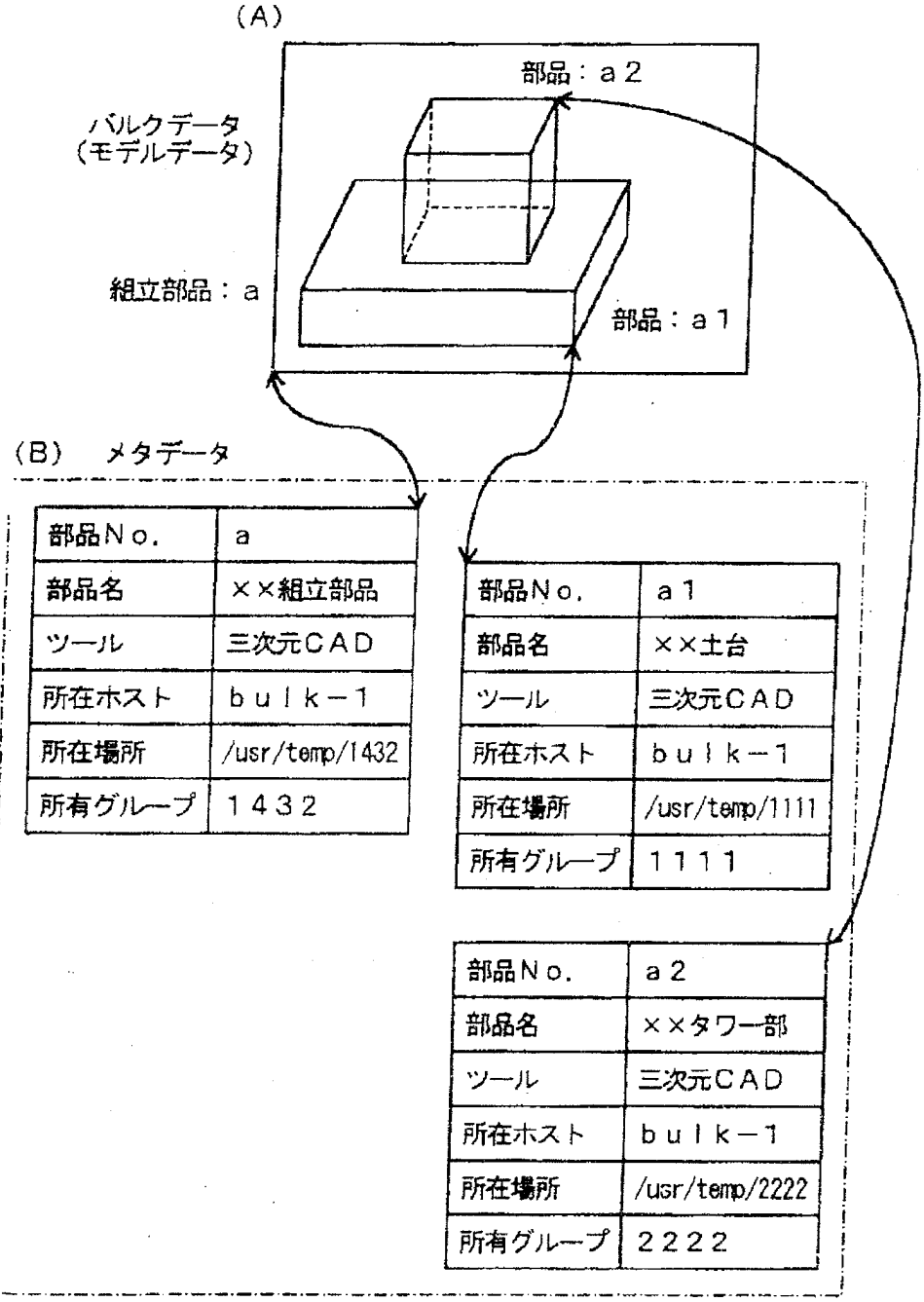
ワーク
ステーション

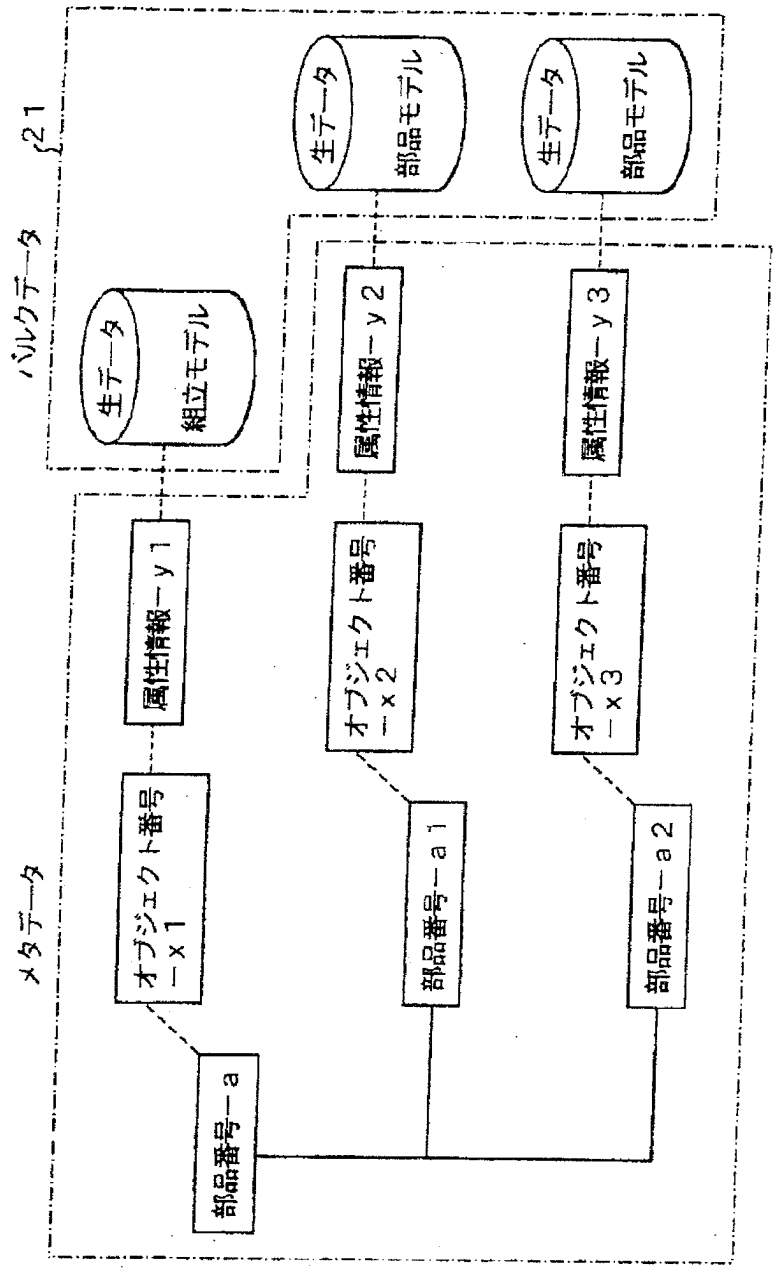
[Drawing 3]

メタデータとバルクデータの例



[Drawing 4]

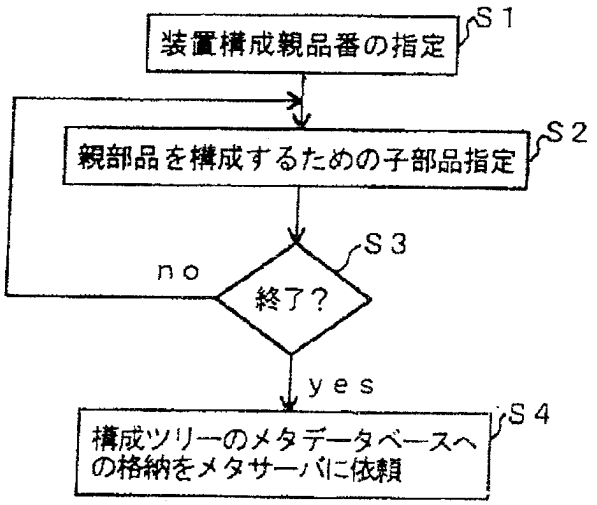
メタデータとバルクデータの関係説明図



[Drawing 5]

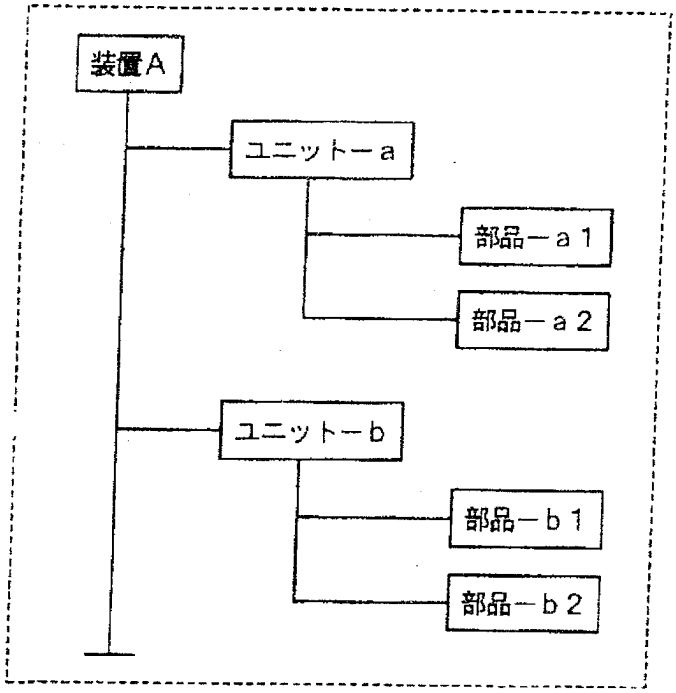
部品構成定義の処理フロー

(A)



(B)

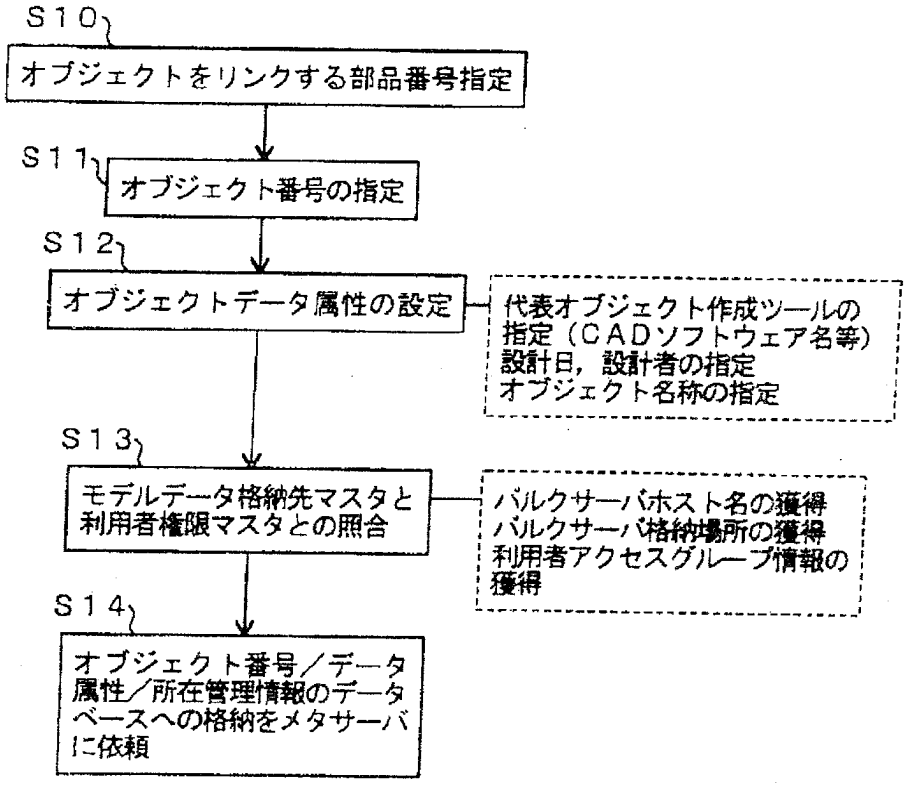
部品構成関連



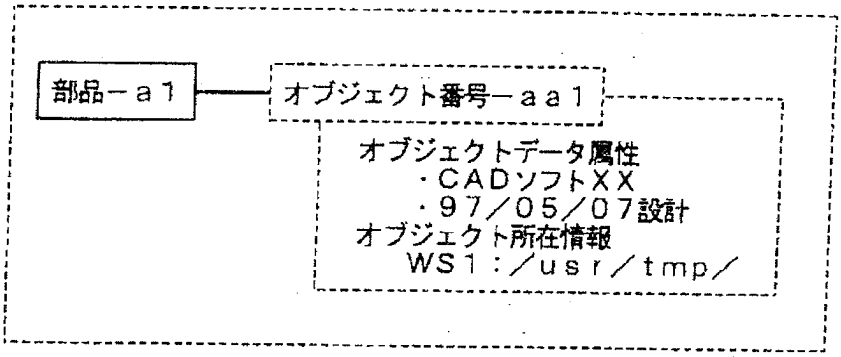
[Drawing 6]

オブジェクト情報定義／属性情報定義の処理フロー

(A)

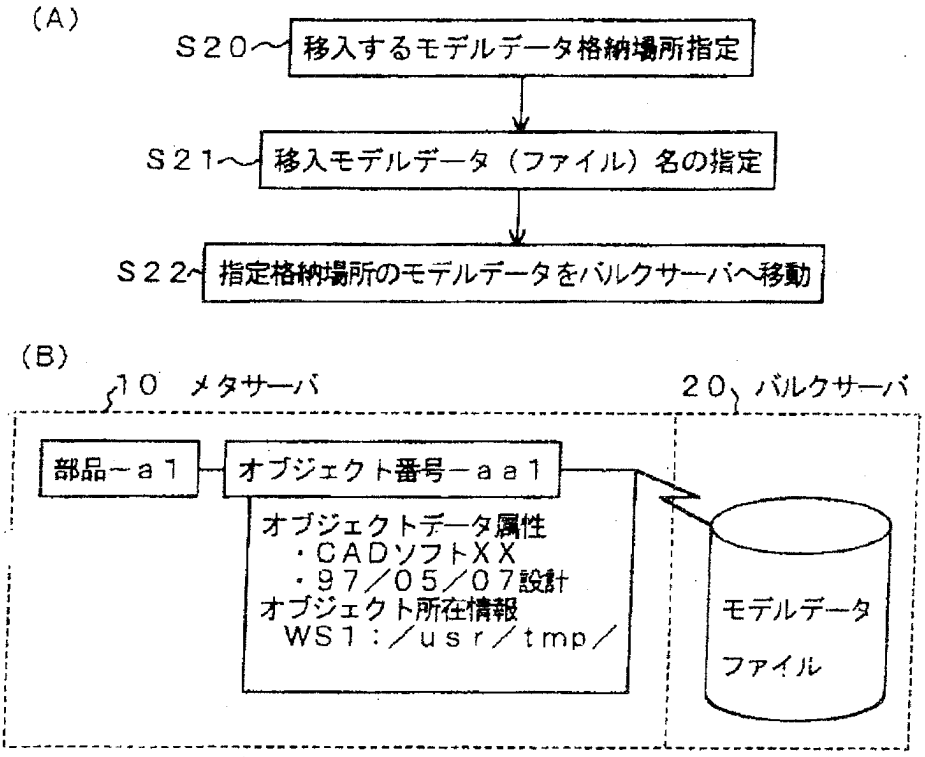


(B)



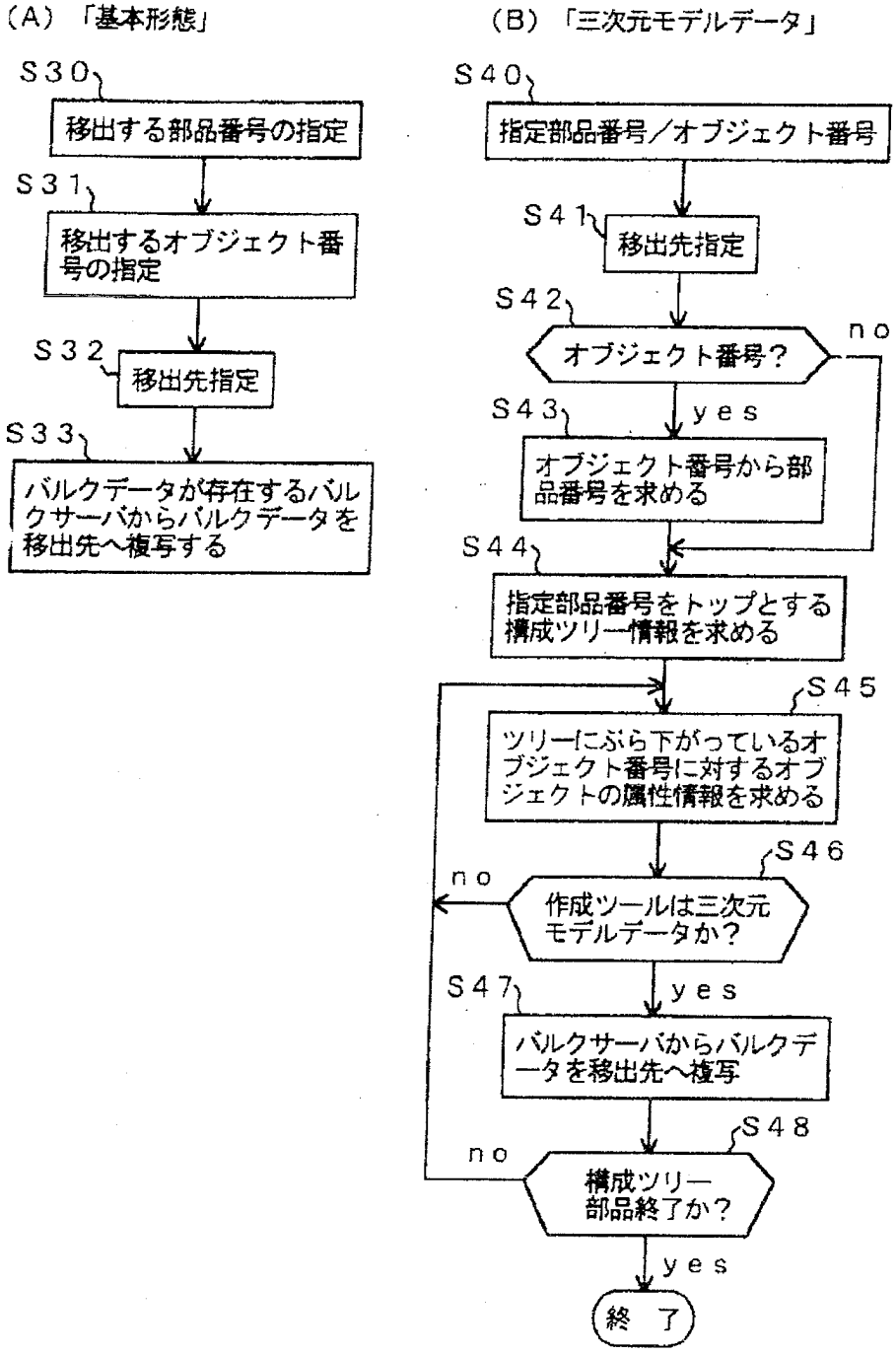
[Drawing 7]

モデルデータ移入の処理フロー



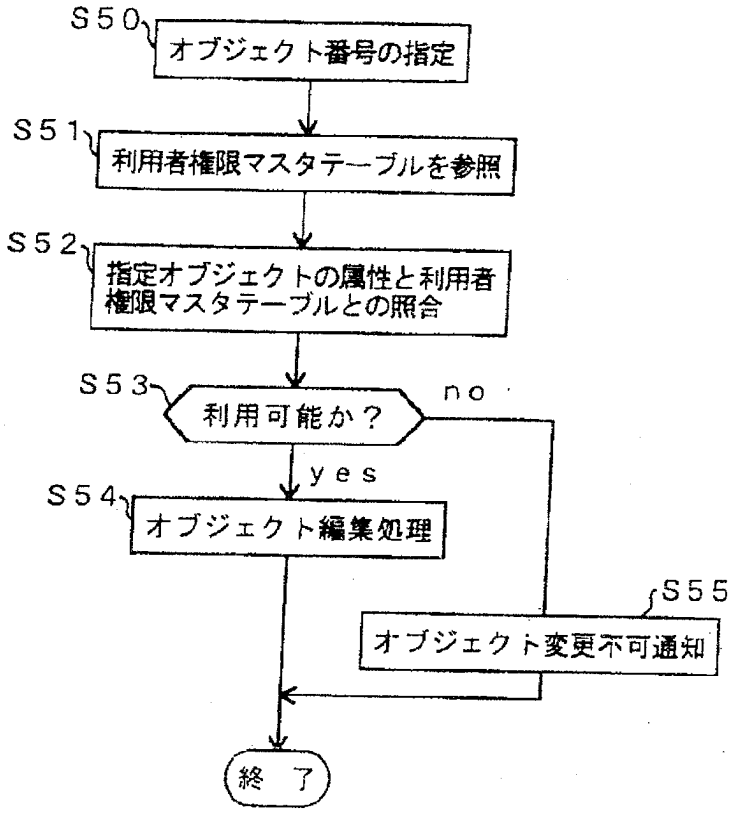
[Drawing 9]

モデルデータ移出の処理フロー



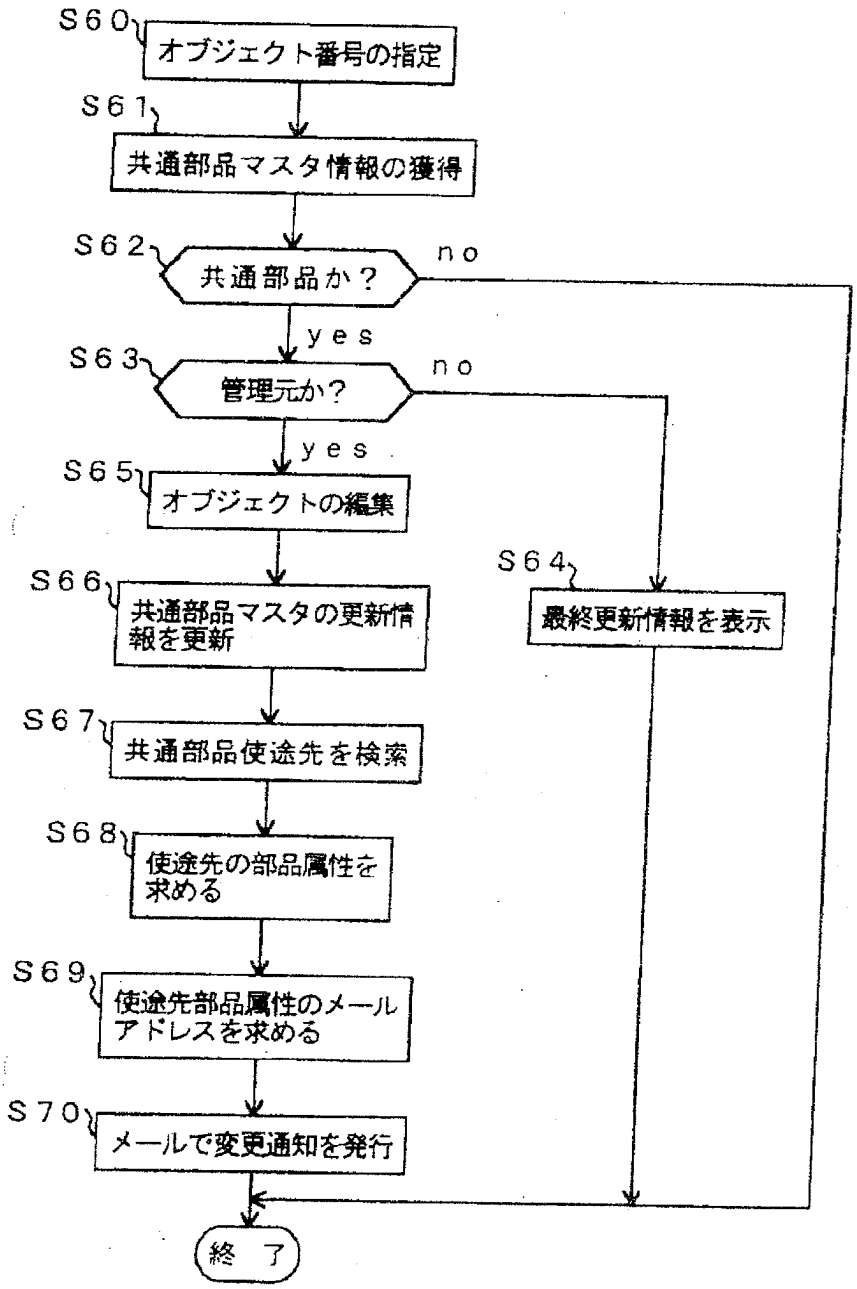
[Drawing 10]

オブジェクト変更可否チェックの処理フロー



[Drawing 11]

共通部品変更通知の処理フロー



[Drawing 12]